

An infographic with a vertical orange line. At the top, a circular inset shows a sea turtle swimming over a coral reef. At the bottom, a larger circular inset shows a close-up of a coral reef. The background is a light blue gradient with a faint image of a coral reef at the bottom.



The Marine Reserves Regional Enhancement Plan for the Wider Caribbean

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World Commission of Protected Areas - Marine (WPCA - Marine)

September 2003

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MAREP

MAREP

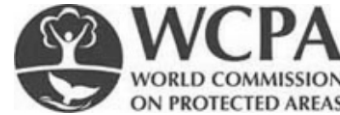
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What is the MAREP?

The Wider Caribbean's Marine Reserves Regional Enhancement Plan (MAREP) is an effort led by the IUCN World Commission of Protected Areas-Marine (WCPA-Marine) aiming at furthering, and ultimately, mainstreaming marine reserves (referred to in this document as no-take areas) as a contribution to biodiversity conservation, and fisheries resources management and restoration for the Wider Caribbean region. The MAREP includes the identification of priority needs and gaps in fulfilling this goal and propose projects that can help researchers, natural resource and protected area managers, and educators to better address those needs.

This plan recognizes the need for sharing resources and coordinating efforts with existing initiatives in order to build synergy and facilitate the accomplishment of the overall objective. The WCPA-marine will assist in identifying potential funding sources for the implementation of the MAREP.

(MAREP) is a tool for biodiversity conservation, and fisheries resources management and restoration for the Wider Caribbean region (or Tropical Northwestern Atlantic Marine Province)



The primary goal of IUCN's marine program is "To provide for the protection, restoration, wise use, understanding and enjoyment of the marine heritage of the world in perpetuity through the creation of a global, representative system of marine protected areas and by building the capacity to manage these areas in accordance with the principles of the World Conservation strategy of human activities that use or affect the marine environment". This project also responds to the vision of the WCPA Marine initiative which is to promote the effective establishment and management of a worldwide, representative network of terrestrial and marine protected areas for the protection, restoration, wise use, understanding and enjoyment of the marine heritage of the world. WCPA-Marine developed a strategy that identified a program for implementation of the most important actions required to create an interactive collaborative partnership at the global, regional, and national levels to build capacity and advance the management of marine protected areas within the global network.

At the core of the WCPA-Marine strategy are three themes that have been identified for the WCPA-Marine activities based on past work and consultations with membership. These priority themes are:

- Sustainable fisheries management and for protecting and restoring marine biodiversity;
- Demonstrate the effectiveness of MPAs as a tool of sustainable fisheries management and protecting and restoring marine biodiversity;
- Sustainable tourism: Create new partnerships in which tourism stakeholders participate in MPA management to conserve, restore and maintain marine ecosystems;
- Integrated Coastal Management: Implement MPAs as exemplary systems of integrated and participatory management, serving as "building blocks" for sustainability through integrated coastal management



Seagrass Monitoring- A Mitchell

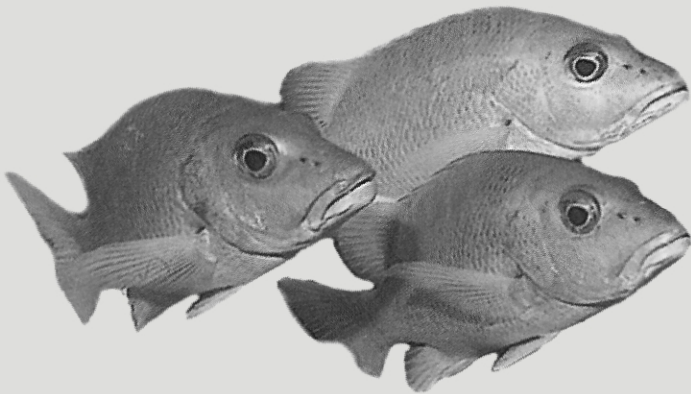
These themes areas are implemented in program activities undertaken by the WCPA-Marine Secretariat and Regional Working Groups, using the unique structure and expertise of IUCN Commissions and Programs as well as IUCN members and partners. Activities are delivered at the global, regional and national levels and are intended to build capacity of institutions and practitioners while building a sustainable network of globally representative marine protected areas.

This MAREP responds directly to the WCPA -Marine activities on sustainable fisheries and biodiversity protection. The MAREP is a collaborative effort to further develop opportunities to establish a role for no-take reserves in marine biodiversity conservation and sustainable fisheries management in the Caribbean in partnership with regional and national sustainable fisheries and marine protected area experts. The MPA Sustainable Fisheries Initiative is designed to develop regional action plans for identifying, establishing, and networking no-take activities in the regions and facilitating access to funding of these activities.

The **background** and **rationale**

MAREP

Marine reserves (also known as fishery replenishment zones, no-take areas and wilderness areas) have attracted the attention of researchers, coastal planners and resources managers as a promising tool to protect marine biodiversity and manage fisheries resources. They are designed to provide a spatial refuge that affords protection to habitats and species by eliminating fishing, harvesting, and other types of extractive activities such as mining and oil extraction (Bohnsack, 1998).



Sustainable

The spatial refuge protects marine populations from harvesting, while more traditional fisheries management methods attempt to provide a numerical refuge which allows a portion of the population to escape harvest. The latter incorporates size limits, fishing quota, gear restrictions, and/or closed seasons, which can result in compliance and enforcement challenges; the former strategy relies on a unique or representative ecosystem that is set aside for non-consumptive usage within geographically defined boundaries. Similarly, spatial refuges will not be effective as a source of fish to the surrounding area if fish harvesting is not well regulated and the regulations are not properly enforced. All tools are important and need to be integrated in a comprehensive coastal-watershed integrated management plan that allows for habitat and population sustainable use

Due to the increasing effectiveness of fishing methods, the historical "spatial refuge" in deep and remote areas is becoming less common. Fishermen go deeper and farther and invest more to get the same catches or, most frequently, to get less and smaller fish. As a result of the decline in fish abundance, current fishermen discredit as exaggeration the accounts of fish abundance by their grandparents, a condition described as 'shifting baselines' (Pauly, 1995; Bohnsack, 2003). Marine reserves also have cultural, aesthetic and scientific values as they provide opportunities to understand the effects of fishery management strategies on ecosystems, enhance economic and recreational opportunities, and protect ecosystem structure and function. Furthermore, they allow people to examine how natural systems functioned decades ago.

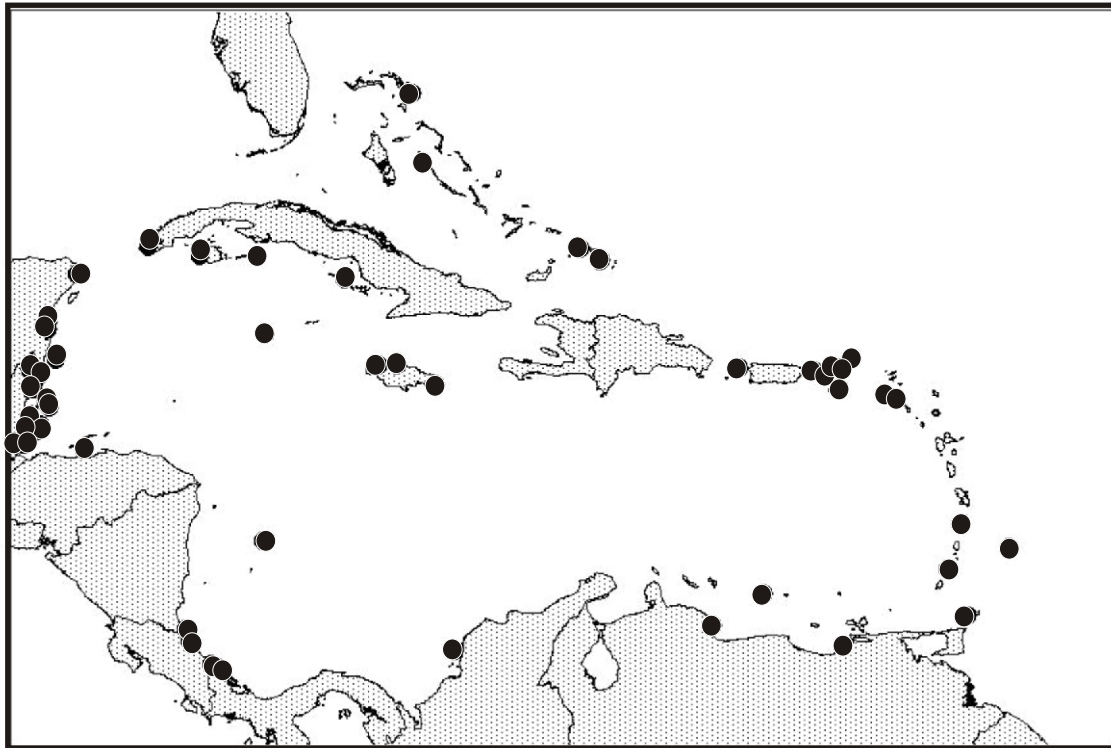
Formal use of marine reserves has grown rapidly since they were first established in New Zealand and Australia in the 1970s (Ballantine, 1989; Bohnsack, 1996). In the Caribbean, as well in many other tropical areas of the world, marine reserves are small and used primarily for conservation and tourism, with greatly variable levels of enforcement and compliance. However, serious consideration of marine reserves as a fisheries management and ecosystem protection tool has only developed recently (Plan Development Team, 1990; Roberts and Polunin, 1994; Dugan and Davis, 1993; Rowley, 1994). Their use has become more accepted and widespread due to the following (Bohnsack, 1998):

- a) International legal changes allowing coastal countries to get a greater control over their marine resources;
- b) Increased research showing the beneficial effects of marine reserves; and
- c) Frequent failures of fisheries managed by other management methods

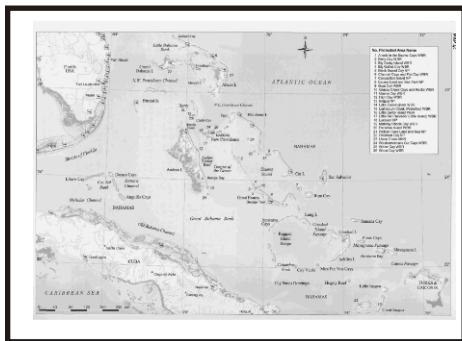
In the Caribbean region, Roberts et al. (2001), in a temporal and spatial analysis of fish abundance and composition, demonstrated how long-established marine reserves in the U.S. Florida (Merritt Island National Wildlife Refuge) and a network of small reserves in St. Lucia (the Soufriere Marine Management Area) have enhanced catches in adjacent areas between 46% and 90%. As further evidence of the benefits of marine reserves, the Exuma Land and Sea Park in The Bahamas has served as a source of fish and conchs to the surrounding area (Sluka et al., 1996; Stoner et al., 1996; 1999).

Despite the clarity of the benefits of marine reserves in Caribbean, implementation of these is still a challenge. Appeldoorn and Lindeman (2003) conducted a survey of the Bahamas and the Caribbean marine reserves (excluding U.S.) and identified 55 no-take marine reserves in 21 countries. The evaluation of geographic patterns, areas and habitats, as well as administrative attributes and compliance, showed that, even though marine reserves are distributed throughout the region, gaps are evident, particularly in Hispaniola Island, the mainland coasts of Honduras and Nicaragua, the north coast of Cuba, and portions along the southern margin of the SE Caribbean subregion (Panama, Colombia and Venezuela). The authors participated in the MAREP experts workshop and their analysis of the marine reserve weaknesses and limitations was considered in developing the MAREP.

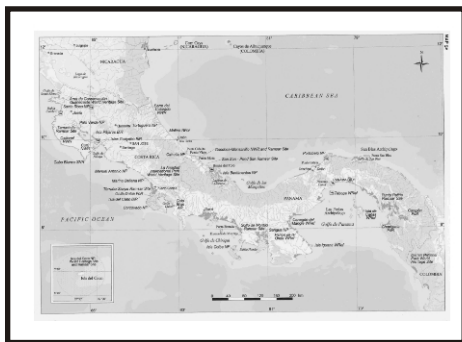
MAREP



Distribution of marine reserves (no-take areas) throughout the Caribbean region (Appeldoorn and Lindeman, 2003).



Distribution of Protected Areas in Bahamas
(World Atlas of Coral Reefs Atlas, UNEP-WCMC)



Distribution of Protected Areas of Costa Rica and Panama
(World Atlas of Coral Reefs Atlas, UNEP-WCMC)

There are existing programs throughout the Caribbean addressing better siting, designing, planning, and managing of marine protected areas. A great majority of these relate to habitats, ecosystems, and species populations characterization, as well as human impacts assessment. Other programs address coral reef conservation through the alleviation of conflicts between different users (e.g. commercial fishermen and tourism operators). Although these programs address some of the questions relevant to no-take areas, they don't cover the most challenging issues such as biological connectivity and marine organisms seasonal and ontogenetic migration. Notwithstanding, recognizing the contribution of those projects and the need to build upon their achievements, we include in this document a brief description of a selected list of major initiatives, particularly those addressing national, transboundary or multinational areas (see Appendix 1).

How MAREP was developed?

The MAREP was developed through a process of consultation that included the following activities:

- Discussion of the need of developing a regional plan at the 54th and 55th Gulf and Caribbean Fisheries Institute (GCFI) annual meetings and other fora such as the International Coral Reef Initiative (ICRI) for the Tropical Americas '02 meeting, the IUCN World Commission of Protected Areas-Caribbean '02, etc.
- The recruitment of a project coordinator with knowledge of the issue, convening capacity, and skills for leading a consultation process;
- The recruitment of experts who could combine individual expertise with institutional representation from a variety of organizations and programs involved in MPA science and practice;
- The launching of an announcement for project proposals designed to be the core of the MAREP;
- The review and evaluation of 44 proposals by 30 selected experts from throughout the Caribbean region;
- The implementation of an expert workshop held in Miami on June 16-18, 2003 with the participation of 30 marine scientists, planners, and managers from 13 countries of the wider Caribbean representing 19 academic and marine resources management institutions (including universities, conservation NGOs, fisheries and protected areas management agencies, UN and other regional organizations, and the Marine and Caribbean World Commissions of Protected Areas);
- The development of this MAREP and the selection of the project proposals that best address the Plan needs based on a set of criteria and following standard guidelines for project evaluation; and
- The presentation of the MAREP to potential donors



Conch Research, R.Appeldoorn

What needs MAREP addresses?

Regional MPA needs were defined at the 2001 Gulf and Caribbean Fisheries Institute special MPA symposium in the Turks and Caicos Islands. Based on this analysis, a comprehensive literature review, and consultations with marine experts in the region, the following four themes were identified for better siting, designing, planning and managing marine reserves in the Caribbean region:

Research and monitoring (biophysical, socioeconomic and governance)

Due to the notable deterioration of fisheries resources in the Caribbean over the decades, fisheries research has shifted focus from fish stock assessment to the ecological status of fish populations and communities. During the 2001 GCFI meeting, 30 experts from 10 countries and a wide range of institutions examined issues at the interface of scientific research (see Lindeman and Appeldoorn, 2003, and www.gcfi.org). The science group agreed to focus primarily on no-take areas, within the context of larger, multi-use zoned MPAs and it endorsed the need for:

Identification and description of critical ecological processes such as fish spawning aggregations and larval recruitment in order to define important population linkages
Bringing stakeholders and researchers together into both research and management processes
Establishing explicit and realistic protocols for measuring effectiveness by defining measurable goals and an array of metrics for each goal to determine marine reserve effectiveness and to detect changes over appropriate time scales.

- *Research and monitoring*
- *Capacity building (education and training)*
- *Effective management (enforcement, sustainable financing, participatory planning and management)*
- *Communication and networking*

Priority needs and gaps in marine reserve research and monitoring were also identified from existing initiatives in the region and expert input and the MAREP's workshop and include:

- Reef fish spawning stocks characterization and
- Biophysical connectivity and larval retention and recruitment;
- Ecosystem structure and functioning;
- The use of adequate indicators to monitor marine reserve success
- Socioeconomic research and monitoring

The experts emphasized the need for applying the right spatial scales for all these studies, the use of comparative approaches, the inclusion of socioeconomic factors (patterns of resources use) in the interpretation and application of research results, and the rapid application of results to management.

Capacity building

Education and training for stakeholders (including, among others, schoolchildren, teachers, resource users, protected area managers and planners, and policy makers), is a major issue for the success of marine reserves in the region. The notion of setting aside a portion of the ocean and restricting its use, and the multiple benefits that this provides to society at large, is new in the Caribbean region and needs extensive outreach efforts in order to be incorporated into the societies' cultural values. This is particularly important in small island states where many people depend on the quality of the coastal area for tourism and fishing, and where watershed and land uses have a strong impact in the coastal environment. Experts agreed on the need for using a creative combination of educational tools, for example, school classes at all levels, mass media, and convening workshops to facilitate communication between scientists, managers, and policy makers. The use of these tools could build trust in the benefits of marine reserves.

Among the most successful capacity building activities (in terms of geographic coverage and frequency) is the UNEP-Caribbean Regional Coordinating Unit sponsored Training of Trainers Course for Wider Caribbean MPA Managers, implemented with the support of ICRAN and other organizations. Each year, 12-18 conservation professionals, mostly MPA managers but also park service technical staff and conservation stewards, receive a 2-week course on the different aspects of MPA management, including training and communication skills. The course is taught in English and Spanish at a venue associated with an existing MPA and provides the trainees basic knowledge on MPA management. Extensive networking opportunities are provided among and between the participants, the instructors

(skilled MPA scientists and practitioners) and the local MPA staff that serves as the course venue. The initiative strives for the expansion of this effort as trainees receive financial and technical support from UNEP-CEP to hold their own training activities at home. Nevertheless, the impact of this activity is limited because the number of applicants is much greater than the financial resources available for support. College courses may also be beneficial to develop and educate MPA managers in the Caribbean region. In this context, and recognizing the need to train marine biologists and policy specialists in this subject, the Universidad Nacional Autónoma de México and the University of Miami held the first joint graduate course on MPA management in Mexico in 2003. Other editions of this course are expected in the next years.

Other initiatives, such as training workshops on reef fish spawning aggregations research and conservation, have been held by The Nature Conservancy in Belize and U.S. Virgin Islands with participants from the Caribbean region. These workshops were the first stage of a more ambitious project: the establishment of a learning center for coral reef and fish spawning aggregation protection in the Caribbean region.

Innovative methods to train MPA managers and stewards, and educate stakeholders (school children, college students, local community groups, business sectors, and decision makers) on the current status of marine resources and the benefits of marine reserves have been identified as a critical need. Needs and gaps include:

- Dissemination of scientific information in understandable terms for the public
- Use of user-friendly media that can reach large audiences, e.g. web based education
- Education targeted towards specific audiences, e.g., decision makers and elected officials
- Incorporate marine reserve concepts into higher education curricula
- Conduct peer-to-peer workshops, e.g. fisher-to-fisher or manager-to-manager
- Marine resources management training activities that include facilitation, negotiation, and conflict management skills (briefly addressed in the Training of Trainers course for MPA managers)
- Evaluation of existing education strategies and programs
- Describe and implement existing successful education programs including where and how they can be used to avoid duplication
- Expand UNEP's Training of Trainers course for MPA managers exploring high tech tools (web-based, satellite broadcast) and alternative audiences (under and post graduate)
- Create and disseminate multilingual educational and training materials
- Dissemination of education and training strategies within existing networks
- Information about economic impact and benefits of marine reserves on the communities

Effective management

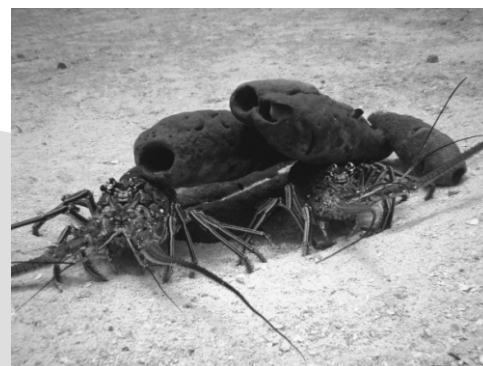
Effective management is an essential component in the success of marine reserves. Many MPAs lack an appropriate management plan or its application is very limited. Despite differences in biophysical and socio-cultural contexts, MPA managers could be guided by standard management tools and strategies to achieve success in community involvement, zoning scheme and regulations, adequate institutional arrangements for compliance and enforcement, sustainable financing, and adaptive management that addresses local human impact as well as global climate change. When adequately managed, these aspects can result in reduction of conflicts, building of trust, and compliance by users and other stakeholders. Revenue generation is also one of the most challenging issues facing MPA managers mostly due to a lack of an appropriate business plan. The publication “Funding Protected Area Conservation in the Wider Caribbean: a guide for Managers and Conservation Organizations”, published by UNEP-CAR/RCU and The Nature Conservancy is an overview of the different funding strategies, including legislation, governmental regulations, or fiscal oversight.

Recognizing the importance of measuring MPA success the World Commission on Protected Areas-Marine, in partnership with World Wildlife Fund (WWF), led an expert consultation process to define indicators of MPA management effectiveness. A series of biophysical, socioeconomic and governance indicators were established and profiled. WWF is implementing

a pilot project in three marine reserves in the Caribbean (Hol Chan, Sian Ka'an and Banco Chinchorro) to test the usefulness and applicability of the methodology and determine if the indicators provide the key elements to assess MPA management effectiveness. This project will also be used to adjust and redirect the management strategies of these areas. The results from these three MPAs will be shared with the Caribbean region and globally. For more information about this initiative see <http://effectiveMPA.noaa.gov/>

The priority needs addressing marine reserve management effectiveness in the region include:

- The lack of management plans or their weak implementation
- Adequate compliance and enforcement of regulations
- Scientifically based zoning schemes and regulations
- Lack of business plans that achieve sustainable financing
- Improved community participation in management planning and implementation
- Dissemination of existing and proven management effectiveness evaluation programs
- Application of scientific research results in management



Lobsters -Juan C. Martinez

Communication and networking

The existing initiatives, including regional list servers and fora, have created a network of marine reserves scientists and practitioners in the region. However, there is a regional consensus that the potential of this network has not been fully achieved and that much can be done to make them more effective and efficient coordination mechanisms in terms of time, scope and geographic coverage. This project particularly addresses these needs by establishing a marine reserve experts network and a regionally coordinated enhancement plan for marine reserves. The WCPA-Marine initiative seeks to develop regional action plans with the Regional Working Group Leaders (WGL) and regional experts. WCPA-Marine intends to market the MAREP at regional meetings and workshops and through direct contact with the donor community. The MAREP will be reviewed annually to evaluate and determine requirements for continued implementation. The WGL will be consulted in the evaluation.

Communication and networking among practitioners is necessary to exchange information, build synergy, and share lessons learned across the Wider Caribbean. One existing network of marine protected area managers and scholars is the Caribbean Marine Protected Areas Network (CaMPAM) created in 1997. The objectives of the network are to provide training opportunities, exchange information, and communicate on problem resolution strategies. Due to lack of funding, the network (which has a listserver managed by UNEP-RCU) has not worked at its full capacity. Other listservers, such as the GCFI and Island Research Foundation, have provided a communication platform for MPA managers. Particularly, the GCFI has had a prominent role as a forum for MPA managers as demonstrated

by an increasing number of marine reserve sessions since 1998 in the annual meetings. In addition, the Caribbean Conservation Association (CCA) is presently creating a regional information network. Nevertheless, the potential of communication tools has not been fully achieved to exchange information and lessons learned, communicate more effectively, and ultimately contribute to marine reserve mainstreaming as a tool for marine biodiversity and fisheries resources conservation.

Needs and gaps in communication and networking as identified by persons in the region and researchers include:

- Fully functional web based network of practitioners by strengthening existing networks or adding marine reserve working groups to the existing networks
- Strengthening communication between existing networks
- Determining clear objectives for the networks
- Determining factors and components that make networks function well and achieve their objectives

Attached is the list of the projects proposals that were selected to form part of the first phase of the MAREP. Some of them are being expanded, merged with others, or narrowed in focus following recommendations of the MAREP team of experts. They are all available to donors that are interested in exploring the possibility of supporting their



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APPENDIX 1

List of major regional conservation initiatives addressing the creation and effective management of marine reserves (no-take areas) as a tool for marine biodiversity protection and fisheries resources management in the wider Caribbean (as of January 2003)

UNEP-International Coral Reef Action Network. Established in 2000, this network is a collaborative effort developed to reverse the decline of the world's coral reefs. It consists of a set of inter-linked, complementary activities designed to assist with the implementation of the International Coral Reef Initiative's (ICRI) Framework for Action, and to facilitate the proliferation of good practices for coral reef management and conservation. UNEP's Caribbean Environment Programme (and its Regional Coordinating Unit (UNEP-CAR/RCU)) is the regional contact point and facilitator for implementation of the ICRI process. The ICRAN project (primarily funded by the United Nations Foundation (UNF)) includes several components: 1) management action; 2) communication; and 3) assessment and information dissemination. It also seeks to attract other donors to implement complementary elements of the project. The project encompasses the establishment of demonstration sites used to promote best practices at selected target sites as well as other MPAs. The project also includes the support of low cost, standardized coral reef monitoring efforts among all participation sites and marine protected areas, including the Global Coral Reef Monitoring Network (GCRMN), the Caribbean Coastal Marine Productivity Programme (CARICOMP), ReefBase, ReefCheck, Atlantic and Gulf Rapid Reef Assessment (AGRRA), the Reefs at Risk threat assessment, a coral reef valuation and policy analysis, and the update and mapping of the existing MPA database for the Wider Caribbean. The development of focused and effective public awareness activities (e.g. campaigns, materials) to raise awareness and influence change, especially around the target communities, is also included. All projects are developed in collaboration with organizations throughout the region.

Gulf and Caribbean Fisheries Institute (GCFI)- The GCFI provides resources for workshops and symposia related to marine protected areas. Among the most notable are the one held in 2000 at the 53rd GCFI annual meeting in St. Croix, U.S.V.I., and a special Symposium during the 54th annual meeting in 2001 dedicated to marine protected areas (MPAs). In the latter one, two documents were generated: "Improving Applications of Science in MPA Design and Management", and "Human system connectivity: a need for MPA management effectiveness" (see www.gcfi.org). In 2002, the symposia "Reef Spawning Aggregation Conservation", and "MPA Socioeconomics" were held during the 54th annual meeting. The former was attended by about 200 scientists, fishermen, MPA managers, fisheries officers, politicians and students. The attendees agreed that marine reserves are an important tool to conserve and rationally manage fish spawning aggregations and emphasized the need to expand the number of marine reserves, but also emphasize the importance of applying scientific information (natural as well as socioeconomic) to site, delineate and effectively manage them. The GCFI is the oldest professional organization of fisheries scientists in the Wider Caribbean. It provides a forum to exchange information on marine resources and their issues by bringing together managers, researchers, educators, students, fishers, and politicians from over 20 nationalities representing academia, resource management government agencies, private sector, conservation organizations, fishing industry, policy-makers, and other stakeholders. In addition to the annual meeting in which the latest issues of marine fisheries research and

management are discussed, a listserver provides a real-time forum for discussion of topics that are of regional importance as well as a mechanism for posting information and soliciting expert advice on issues that require immediate assistance. The web site has announcements of meetings, marine resource news from the region, a discussion board, and results of findings from GCFI workshops. Links are also provided to marine organizations in the region.

MesoAmerican Barrier Reef System Initiative (MBRI). This is a regional program designed to jointly manage and protect coral reef ecosystems by strengthening and coordinating national policies, regulations, and institutional arrangements across Mexico, Belize, Guatemala, and Honduras for marine ecosystem conservation and sustainable use. Under this program, a regional project, entitled the "Conservation and Sustainable Use of the Mesoamerican Barrier Reef System", is being developed with GEF and bilateral donor support. Specific objectives of the project include: (i) develop integrated management plans for the sustainable use of coastal and marine ecosystems and the diverse resources, goods and services they provide; (ii) strengthen local and national capacity for environmental management through education, information sharing and training; (iii) standardize ecosystem monitoring and facilitate its execution and dissemination of results throughout the region; (iv) strengthen institutions and programs for maintenance of water quality and prevention of contamination, particularly in transboundary situations; and (v) establish transnational coordination and cooperation mechanisms for harmonization of policies (including laws, standards, regulations and enforcement mechanisms) related to the conservation and sustainable use of the MBRS. For more information, see <http://wbln0018.worldbank.org/MesoAmericanBarrierReef/>

The International Coral Reef Initiative (ICRI). ICRI is an environmental partnership and an informal mechanism that allows representatives of over 80 developing countries with coral reefs to sit in equal partnership with major donor countries and development banks, international environmental and development agencies, scientific associations, the private sector and NGOs to decide on the best strategies to conserve the world's coral reef resources. The ICRI for Tropical Americas is coordinated by the UNEP Caribbean Regional Coordinating Unit in Kingston, Jamaica. The last meeting of the ICRI for the Tropical Americas (June, 2002) examined the main problems facing coral reefs MPAs, and provided a series of recommendations. A report of this meeting with recommendations will be available at www.cep.unep.org.

Caribbean Coastal Marine Productivity Program (CARICOMP). The Caribbean Coastal Marine Productivity (CARICOMP) Programme is a regional scientific effort to study land-sea interaction process, to monitor for change, and to provide appropriate scientific information for management. The Programme focuses on understanding the productivity, structure and functions of three important coastal ecosystems throughout the region: mangroves, seagrasses and reefs, throughout the region. Most sites are within MPAs. Scientific monitoring of these three ecosystems is performed on a daily, weekly and twice annual basis throughout the region using the same monitoring protocol. Twenty-nine marine laboratories, parks and reserves, in 13 islands and 9 mainland countries have now joined the CARICOMP Programme which has a central CARICOMP Data Management Centre (DMC) at the University of the West Indies in Kingston, Jamaica. Summaries of all data are distributed to each site by the DMC which also coordinates investigations of transient regional phenomena, such as mortality in sea fans and coral bleaching. Results of this project can be found at <http://www.marine.usf.edu/FIO/caricomp.html>.

Socioeconomic Monitoring for Caribbean Coastal Management. Developed by the University of the West Indies (UWI) Natural Resource Management Programme (NRM) and World Commission on Protected Areas-Marine (WCPA-Marine), the project aims at establishing a long-term, region-wide monitoring system for collecting, analyzing and comparing socioeconomic data through collaborating coastal management programs across the Wider Caribbean. The socioeconomic monitoring program is designed to help coastal managers better understand the communities whose activities affect, and are affected by, coastal management decisions. Managers and stakeholders can use such information to minimize the negative socio-economic impacts of decisions and demonstrate the value of coastal resources and incorporate community concerns into decision-making. This initiative is part of the Global Coral Reef Monitoring Network's goal to promote socioeconomic monitoring around the world, based in part on the Socioeconomic Manual for Coral Reef Management released in November 2000. Major outputs are: 1. Development of concise socioeconomic monitoring guidelines for coastal management programs in the Caribbean, building on existing ones; 2. Establishment of socioeconomic monitoring practices in the region; 3. Implementation of a workshop at UWI to train about 15 coastal managers from the region on how to develop and implement socioeconomic monitoring programs based on the guidelines; and 4. Establishment of Caribbean socioeconomic monitoring programs for coastal management through collaborating coastal programs and projects, with the UWI providing support training and serving as a focal point for information sharing among participants to ensure sustainability.

Testing Management Effectiveness Guidelines in three MPAs in the Mesoamerican Caribbean (WWF-ICRAN-NOAA). The project aims at testing the usefulness and applicability of WCPA/WWF methodology for assessing management effectiveness in three MPAs in the Mesoamerican Caribbean Reef ecoregions: Sian Ka'an and Banco Chinchorro Biosphere Reserves, in Mexico, and Hol Chan Marine Reserve, in Belize. They will also be used to adjust and redirect the management strategies of these areas. The results will be shared with WCPA, WWF and ICRAN so as to improve upon the guidelines and disseminate this experience throughout the Caribbean region and globally.

A regional approach for promoting long-term sustainable use and conservation of marine resources in the Eastern Caribbean States (ECS). The project coordinated by NOAA, is stated as follows: a) Development of a regional information database on fisheries harvests and marine protected areas in the ECS; b) Development of a comprehensive meta-database on existing information on the life history (life stages), relative abundance and distribution, of fishes and invertebrates by species for selected ECS islands; c) Assessment of coral reef community structure at selected existing and candidate no-take reserve sites in the ECS; d) Assessment of ocean current dynamics impacting selected existing and candidate no-take reserve sites in the ECS; e) Development of GIS baseline information and maps to that show the distribution of major habitat types, coastal zone use, protected areas, and fish distribution across the region; f) Implementation of a workshop in the ECS on the scientifically quantitative basis for establishment and evaluation of no-take marine reserve management regimes; g) Development of proposals for pilot projects in one or more ECS countries to demonstrate the effectiveness of this scientifically quantitative approach for establishing marine no-take reserves; and h) Development and preliminary training for an information clearinghouse and a web-based GIS program through CEPNET or a similar program. This project is still in progress.

UNEP-Specially Protected Areas and Wildlife (SPA) Programme for the Wider Caribbean. Established since 1990 following the adoption of the only biodiversity-related legal agreement for the region, the SPA Protocol of the Cartagena Convention. The Programme was developed to respond to the main issues being addressed under the Protocol and to assist governments of the region in meeting the SPA objectives. Major areas of focus of the SPA Programme include: 1) Strengthening of protected areas, including MPAs with the establishment of a network of MPA managers (CaMPAM), a Small Grants Fund for MPAs and a Training of Trainers Programme; 2) Development of guidelines for protected area establishment and management, including guidelines for sustainable financing and their implementation; 3) Conservation of endangered and threatened species, including management and recovery plans for key species of regional concern; and 4) Conservation of major coastal and marine ecosystems, including mangroves, monitoring, assessment and best practices for coral reefs (see ICRAN below), promotion of best practices for sustainable coastal tourism and education and awareness. With the entry into force of the SPA Protocol in 2000, this programme is expected to grow and expand to continue assisting governments with implementation of the Protocol."

Transforming Coral Reef Conservation in the 21st Century. The Nature Conservancy (TNC) and Conservation International (CI) have led a highly collaborative global initiative to transform the way marine protected areas (MPAs) for coral reefs and associated habitats are selected, created, designed, managed, and financed. The goal is to catalyze a worldwide effort to establish networks of MPAs within high-biodiversity tropical marine ecoregions that are designed to survive, managed to last, and connected like strings of pearls across our ocean planet. The initiative includes MPA sustainable financing mechanism, dissemination of lessons learned across the region, the incorporation of coral bleaching resilience, biological connectivity and spawning aggregation sites to marine reserve siting criteria. For more information on this initiative, contact Scott Smith (ssmith@tnc.org) or Rod Salm (ssalm@tnc.org).

Greater Caribbean Ecoregional Plan. The Nature Conservancy is conducting an ecoregional assessment of the terrestrial (and freshwater) and marine biodiversity values and conservation issues of the wider Caribbean region from The Bahamas south to Venezuela and Trinidad and Tobago. The project involves a number of TNC scientists and conservation experts working together with collaborators and aims at establishing strategies for conservation actions using TNC's Conservation by Design methodology. The process includes the compilation and mapping of conservation targets (species and biological communities) occurrence and socioeconomic information, the analysis of the impact of resource use, a threat assessment, the definition of conservation goals to maintain the targets' ecological integrity and viability, and the establishment of strategies for threat abatement. The project includes collaboration with local and regional experts, the consultation stakeholders, and the development of strategic alliances with relevant governmental and non-governmental organizations. The information will be accessible to the public by 2005, and the data base will dynamic and updated. For more information on the CERP, contact Richard Jeo (rjeo@tnc.org), the project manager.

Establishment of effectively managed MPA platform sites as foundations for resilient networks of functionally-connected MPAs. This project has the long-term objective of helping create a resilient network of well-managed mutually replenishing MPAs designed to mitigate local and global threats within the Meso-American Reef. Given the size of this ecoregion, the number of public and private institutions involved, and the costs of creating a viable reef network, TNC recognizes it is only one of many entities participating in this challenging program. Therefore, the Conservancy has identified a specific set of activities in which it believes it can make a significant impact. These activities build on a strong foundation of work with NGO partner organizations in the MAR region, and its important scientific contributions to reef monitoring and MPA management. The maintenance of coastal and marine natural community structure, habitats, species, and ecological functions at least at current levels. Toward that end, the Meso-American Reef ecoregion is served by a resilient network of mutually replenishing MPAs that are well managed, financially self-sustaining, effectively linked to coastal and inland communities, and able to facilitate and maintain the ecological make-up and functions of the reef. In furtherance of these goals, the project will seek to accomplish the following specific outcomes by the end of 2008: A MAR ecoregional plan is adopted and implemented that reflects agreement by all key conservation partners (local and international NGOs, government agencies and donors) on priority programs and activities, adoption of conservation best practices, and sharing of scientific and program data; five MPA platform sites and their management partners are strengthened sufficiently so that they are integral links in the MAR regional MPA network; all high priority reef fish spawning aggregation sites (SPAGs) throughout the MAR identified, monitored, and protected by inclusion in existing or new MPAs; sites resistant to coral bleaching throughout the MAR are identified and monitored; the technical, managerial and marine science skills of at least 2,000 people enhanced and result in improved MPA management; new economic opportunities for fishers and their families, more effective community leaders and conservation activists, and improved scientific understanding by both private and public stakeholders.

Territorial Marine Park of the U.S. Virgin Islands. In January 2003, the Governor of the U.S. Virgin Islands signed into law legislation that created the first territorial marine park, the 60 square mile East End Marine Park, encircling the entire East End of St. Croix. The park includes 5 square miles of no-take areas, protecting the majority of the near shore reef habitats on the east end. The legislation was based on a collaboratively developed Management Plan, written by The Nature Conservancy (TNC) over a nearly one year period, that included significant stakeholder involvement from fishermen, diver shop operators, yachters, local and federal governmental agencies, non-governmental organizations and universities. While the Coastal Zone Management (CZM) Division of the territory's Department of Planning and Natural Resources (DPNR) is responsible for implementing the Management Plan, local stakeholders maintain a proactive role in the implementation of the Management Plan, serving on a East End Marine Park Management Committee. E.g., TNC assisted CZM with writing draft Rules and Regulations for the Park, which still need to be approved, as the Park can not begin functioning until they are in place. The Ocean Conservancy (TOC) is currently coordinating NOAA's Coral Reef Local Action Strategies which are focused on addressing recreational overuse, education/outreach, overfishing, and upland pollution and erosion within the Park. TNC, the University of the Virgin Islands (UVI), and DPNR are providing leadership on individual strategies. TOC, TNC, and UVI are also collaborating on

National Fish and Wildlife Foundation funded projects, such as utilizing local fishermen trained as researchers to map and characterize the territory's (and British Virgin Islands) reef fish spawning aggregation sites, developing an audio-visual displays based on anecdotal and research information in order to illustrate the phenomenon of Understanding Shifting Baselines in Coral Reef Ecosystems of the US Virgin Islands, and others. All these activities aim at increasing awareness among stakeholders on the benefits of marine reserves and promoting the cooperation of the local community with the marine park.

A Caribbean-wide survey of "no-take marine reserves" spatial coverage and attributes of effectiveness. The authors of this paper (see bibliography list below) compiled information on reserves from 21 countries in order to 1) assemble a spatial framework to aid development of networks of reserves at the most effective spatial scales, and 2) aid policy makers in establishing reserves that are science-based and possess optimal management attributes. The study concluded in the following: since 1958, there have been over 50 reserves established in the Caribbean (an additional 30 in Bermuda) with the rate of implementation increasing since the mid 1980's; most reserves are small (< 1,000 ha) and few contain the range of habitats necessary for protecting species through their ontogeny; habitats are often not fully characterized, and the role of reserves in protecting and networking different habitats cannot be ascertained. Reserves are distributed throughout the region, with the highest density in Mesoamerica; but significant geographic gaps exist. It is unlikely that reserve-enhanced larval dispersal significantly networks populations on a regional basis, although this may occur subregionally (e.g., Mesoamerica). Less than 20% of the reserves were scored as fully compliant, but half offer potentially significant levels of protection.

APPENDIX 2

The following proposals were selected as part of the MAREP. A brief summary of each project is provided that includes a short project description, objectives, outputs, and outcomes. For more details on the projects, please contact the MAREP coordinators to obtain the full contact information for the proposal contact names listed for each project.

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Title: Technology for Effective Marine Reserve Design and Management:
A Pilot Study for Caribbean-wide Application and Technology Transfer

Project Contact: Ms. Rebecca Cerroni, Wildlife Conservation Society, New York

Project Description:

This is a regional scale effort to provide marine scientists and managers with information about how marine reserves function and which technological tools are most effective in studying and managing them. This work is part of a larger partnership with strengths in marine fisheries science, oceanography, undersea research, field-based marine conservation, and the biology and ecology of temperate and tropical marine systems. For this proposed regional project, partners include the University of North Carolina at Wilmington, Boston University, the Pflieger Institute of Environmental Research, and the Wildlife Conservation Society.

Project objectives:

- To use emerging technological tools to solve conservation problems faced in the implementation of marine reserves throughout the Caribbean region, namely, telemetry and remote sensing/GIS.
- To focus on the practical conservation applications of new animal tagging technology and remote sensing and Geographic Information System technologies to improve the design and implementation of marine reserves throughout the Caribbean Sea.

Outputs and outcomes

- A “Technology Toolbox” that can be lent to or replicated by other institutions involved in the design and management of marine protected areas (including acoustic tagging equipment and portable acoustic receivers);
- A manual outlining the methodology utilized in the project; practical policy guidance for decision-makers on the appropriate design of marine protected areas for the conservation of economically and biologically valuable species;
- Workshops and training sessions for conservation professionals;
- A better understanding of how marine reserves function and which scientific tools are most powerful in advancing that understanding; and a set of tools to make marine conservation more effective in practice.
- In-situ monitoring information will be available through the public program website at www.mpadesign.org (proposed name). Tutorials will be available at the website to instruct future site personnel and promote public understanding of the use of technology to conserve dynamic marine environments throughout the world;
- International peer-reviewed scientific journal articles; and
- Technical training workshops and opportunities for graduate level scientists in the field.

Total Project Cost: \$487,507

Title: Netherlands Antilles Global Coral Reef Monitoring Network (GCRMN) Node

Project Contact: Paul Hoetjes, M.Sc., Netherlands Antilles Coral Reef Initiative (NACRI), Netherland Antilles

Project Description:

Only two of the five islands of the Netherlands Antilles presently monitor the reefs through volunteer efforts that are in danger of phasing out without some recognition and training. This project will fulfill these needs for the existing groups as well as present them with the possibilities of helping the other islands and monitor in new sites. Training by the monitoring node coordinator will help revitalize the existing groups and establish new monitoring groups on the other islands. The training will lead to standardization of protocols between the islands, and increase the number of volunteers. Newly collected data on fish and invertebrate populations, coral diseases, and coral cover will help decide on management issues, such as whether or not to establish no-take zones, or the effects of existing no-take zones. Determining effects of land-based sources of pollution will help to make policy changes.

Project Objectives:

- To train volunteers in standardized monitoring methods;
- To enhance cooperation between monitoring groups on the different islands to create a volunteer network;
- To obtain data on the status of the reefs of the Netherlands Antilles, and prepare an annual Status of the Coral Reefs of the Netherlands Antilles report to support effective management and policy making;
- To activate, or strengthen, and coordinate monitoring activities on each island through a central coordinator;
- To establish a central web accessible database to store and make available all collected monitoring data;
- To link to regional and global initiatives, i.e. GCRMN, Reef Check and CARICOMP;
- To expand monitoring activities in Bonaire and Curaçao with monitoring of environmental indicators i.e. nitrates, N15 and Chlorophyll-a concentrations in the seawater;
- To establish a yearly monitoring program of the Saba Bank for management support;
- To establish a yearly monitoring program for the Venezuelan Islas de las Aves for comparison purposes, and to create a comprehensive monitoring network from Los Roques to Curaçao

Project Outputs:

- Report on the Status of the Coral Reefs of the Netherlands Antilles, including the Saba Bank and the neighboring Venezuelan Aves islands, and including management and policy Recommendations
- Baseline data on the coral reefs of the Saba Bank and the Aves islands.
- Newly vitalized volunteer monitoring groups in Curaçao and Bonaire
- Establishment of volunteer monitoring groups in St. Maarten and St. Eustatius working with the MPA management.
- Capacity for continued nutrient monitoring in Bonaire and Curaçao, available for other islands as well.
- Report on the levels and distribution of nutrients in the coastal waters of Bonaire and Curaçao and recommendations for wastewater management.
- Central web-based database for monitoring data of all the islands, allowing easy access to, and submission of data, quick return of visible results, and facilitating submission of national data to regional and global databases.
- Increased publicity about volunteer activities and the status of the reefs.
- Increased local sponsoring availability
- Increased cooperation with Venezuela regarding coral reef conservation
- Infrastructure and capacity for continued coral reef monitoring

Total Project cost: \$ 106,900

Project Contact: Reinaldo Estrada, Centro Nacional de Áreas Protegidas (CNAP), Cuba

Project Description:

The project will formulate an application for the naming of the Canarreos and Jardines de la Reina Archipelagos as a World Heritage site. These archipelagos are south of Cuba and have an extension of 800 km. They contain 11 protected areas with diverse and ecologically related ecosystems such as mangroves, sand banks, coral reefs, and coastal terrestrial ecosystems. Geographic Information System technology will be used to assist in the preparation of the application.

Project Objectives:

- Elaboration of the World Heritage Site proposal for the combined sites
- Establishment of the boundaries that include the 11 MPAs
- Establishment of a Geographic Information System to support management of the 11 areas
- Strengthen and develop management capacity for the system

Outputs and Outcomes:

- Established infrastructure for the development of a Geographic Information System
- A GIS with characterization of all the areas in the proposed system that will assist in management of the area
- Established physical boundaries of the proposed system
- Communications network for the system
- Filled informational gaps on sensitive areas
- Legal approval of site profiles
- Proposal for World Heritage Site designation

Total Project Cost: \$100,000

Title: Providing the scientific basis for designing marine reserves in the Bahamas

Project Contact: Dr. Craig Dahlgren, Perry Institute for Marine Science/ Caribbean Marine Research Center, Lee Stocking Island, Bahamas

Project Description:

In 2000, the Bahamas drew international attention when it committed to creating a network of marine protected areas and marine reserves that encompass over 20% of its coral reef, seagrass and mangrove ecosystems, and chose five new sites to start building this network. The Bahamas Department of Fisheries (a government agency) and the Bahamas National Trust (an NGO), lack the expertise and personnel to conduct ecological studies to assess and evaluate proposed reserve locations and financial resources to ensure compliance with marine reserve rules through enforcement. The government has actively pursued partnerships with marine research and education organizations in the Bahamas to provide the technical expertise for creating ecologically sound MPAs and the educational resources to build public support for these reserves. The Perry Institute for Marine Science's Caribbean Marine Research Center (CMRC), a US-based non-profit research institution with a field station and laboratory on Lee Stocking Island, Bahamas, has been an important partner with Bahamian organizations in this regard, and has played a lead role in both research and education in support of the creation of marine reserves in the Bahamas. The overall goal of this project is to promote the creation of effective marine reserves in the Bahamas by improving the scientific basis for their design.

Project Objectives:

- To evaluate the efficacy of an existing marine reserve within the Bahamas, the Exuma Cays Land and Sea Park and raise awareness within the Bahamas of the success of the Exuma Cays Land and Sea Park;
- To conduct baseline site assessments of key species as well as reef fish and benthic communities at proposed marine reserve sites (fishery reserves and national parks) in the Bahamas (e.g proposed marine parks at Andros island, Great Exuma, and marine fishery reserves at Bimini, Chub Cay, The Exuma Cays and Cape Eleuthera) and implementing effective monitoring programs for these reserves
- To continue studies of movement rates of important species in the Bahamas
- To build capacity for Bahamians to become involved in assessments and monitoring of these areas through educational programs and opportunities at CMRC's field station and laboratory at Lee Stocking Island, Bahamas.

Outputs and Outcomes: Ultimately, the long-term expected outcome of this research is the creation of an effective marine reserve network to safeguard Bahamian marine ecosystems and populations of key species. Specific projects outputs and outcomes include:

- A comprehensive evaluation of the efficacy of the Exuma Cays Land and Sea Park
- Comprehensive characterization of marine resources, habitats, and ecological community characteristics in proposed marine reserves around the Bahamas.
- Presentation of information in reports to the appropriate decision makers and management agencies for their consideration in designating reserves in these areas
- Development of detailed habitat maps of proposed marine reserve sites
- Development and implementation of a long-term monitoring program for proposed and existing marine reserves
- Involvement of local participants in research to build awareness of marine reserve benefits and
- build capacity for Bahamians to conduct site assessments and monitor effects of future marine reserves

Total Project Cost: \$234,000

Project Contact:: Stephanie Wear, The Nature Conservancy (TNC), Virgin Islands and Eastern Caribbean

Project Description:

Through the Reef Fish Spawning Aggregation Identification Project, the Virgin Islands and Eastern Caribbean Program of The Nature Conservancy will partner with local institutions to locate and characterize important spawning aggregation sites. This information will be used by marine resource managers to designate areas for protection and management throughout the Virgin Islands. In addition, it will contribute to the efforts of scientists already conducting SPAG research. The identification and characterization of these sites is a collaborative effort, with emphasis on the inclusion of local fishermen in research and educational activities. As this project advances, these methods will be applied to other parts of the Caribbean and contribute to the Caribbean Basin Eco-regional Planning effort. During the conclusion of the project, efforts will focus on assisting the fishermen, resource managers, and other stakeholders in protecting those spawning aggregations not already protected. The focus will be on providing the stakeholders the information necessary to present their case to the relevant governments.

Project objectives:

- Locate and characterize important spawning aggregation sites in partnership with local institutions
- To use information to designate areas for protection and management throughout the coastal waters of the Virgin Islands (both U.S. and British), and include the information in TNC's Virgin Islands Marine and Coastal System Conservation Area Plan and the Caribbean Basin Ecoregional Plan.
- To include local fishermen in research and educational activities.

Outputs and outcomes:

- Two fishing aggregation educational workshops for 28 fisherman
- Video on SPAG activity for use in community awareness and advocacy activities
- Participation of eight fishermen and researchers at two Gulf and Caribbean Fisheries Institute meetings
- Integration of project into TNC's Caribbean Basin Eco-regional Plan/Virgin Islands Marine & Coastal System Conservation Area Plan
- Educated and empowered stakeholders who will be capable of seeking legal protection of SPAG sites.
- Detailed physical descriptions of Study Areas.
- Visual Survey of SPAG site including fish behavior and physical characteristics of site.
- Maps of benthos cover and structure of spawning sites.

Total Project cost: \$487,845

Title: A Course on Marine Protected Areas (MPAs) for South Florida and the Mesoamerican Region

Project Contact: Dr. Ligia Collado-Vides, Florida International University, Miami, Florida

Project Description:

This project will offer a course open to people interested in MPs from the Caribbean region that includes South Florida, México (Quintana Roo), Belize, Guatemala, Honduras, and Cuba. This course is already officially accepted in the graduate program of the National University of México (UNAM), the University of Miami (UM/RSMAS) and the Florida International University (FIU), with credit value for students. The main objective is to involve formal students, as well as other involved persons, in the subject of MPAs and create a space for the interaction between universities and other management sectors (government and Non-governmental organizations -NGOs). Students will have the optimal human links of the region (managers, NGOs and researchers) that will allow them to develop projects on evaluation of existing MPAs, promote the development of no-take areas inside the already existing parks and participate in the development of new no-take areas in the region. The course will be focused on biological and social aspects with a thorough analysis of the particularities of the region. Special attention will be directed to the no-take concept supporting the creation of no-take in the region as well as in already existing marine parks.

Project Objectives:

- To Promote the Universities as active participants and supporters of education and training of students on MPA;
- To create links between the universities, students, research programs, and facilities with the management sector (government and NGO's) that requires well-educated managers today and in the future;
- Promote the interest of graduate students in Marine Protected Areas, especially no-take reserves
- Promote the communication between the academic (Universities) and management sectors of MPA's (Government and NGO's)
- To create the need of this kind of courses in the Marine Policy and Marine Biology graduate programs of the participant Universities
- To create a permanent course on MPA's supported by the Universities, and a permanent link between the participant universities and the MPA management sectors of the region

Outputs and Outcomes:

- The inclusion of a graduate course in three universities on MPAs with credit value
- A stronger group of managers and students prepared to deal with MPAs issues.
- Strong link between universities and Marine parks and marine reserves
- Exchange of ideas and needs between managers, students, and researchers
- Power Point presentations of the different subjects analyzed in the course. Those presentations will be distributed among the participants in order to give them the tools to promote the education on MPAs in their particular communities. They will also be available to the graduate teachers of the universities and the supporting agencies of the course
- A file of lectures to be offered to the undergraduate and graduate programs of the universities of the region, and also to the participants in order to be used for the diffusion of the lectures offered during the course among MPAs managers
- A publication of the proceedings of the course

Total project cost: \$39,500

Project Contact: Dr. Richard Appeldoorn, University of Puerto Rico-Mayagüez, Puerto Rico

Project Description:

The main task of this project is to offer two intensive 10-day workshops to train and to allow interaction of scientists, managers and NGO'S from remote isolated Caribbean MPA`s to acquire, interpret and utilize habitat information to define criteria to site MPA's. The two phases will be one year apart to allow participants to collect, interpret and generate maps for their own area, which will serve as input for the second training session.

Project Objectives:

- To train scientists, managers and NGO`s responsible for implementation of MPA`s located on remote and isolated reef systems, in practical sonar methods to collect detailed habitat information. Training will cover also analysis of existing aerial photographs or satellite imagery.
- To increase experience interchange in planning field work on distant oceanic areas looking at international/national cooperative alternatives by establishing working networks.
- To teach habitat concepts based on biological and ecological criteria, incorporating them into MPA management and designation.
- To increase capacity building by incorporating GIS tools to process and analyze habitat information on a multi-scale perspective, as well as using various sources of imagery. Capacity building will be oriented to follow-up participants through two sets of training.

Outcomes:

- Scientists, managers and NGO´s aware and trained about the importance of habitat considerations when designing and implementing MPA´s.
- Experienced team on electronic, electrical and navigational requirements to collect habitat information using Side Scan Sonar (SSS) on remote areas.
- Experienced team on interpreting aerial photographs for generation of habitat maps
- Determination of specific requirements needed in four remote MPA to acquire detailed habitat information including alternatives
- A benthic map generated for selected areas Available techniques for mapping remote reefs areas updated Project evaluated

Outputs:

- One guideline of habitat concepts based on ecological criteria and considering multiple scales of work.
- One guideline of SSS requirements, SSS data processing, geospatial analysis, including a catalog of habitats detected by SSS.
- One catalog of habitat as detected by aerial photographs.
- One document providing cooperative alternatives to collect detailed habitat information on remote isolated MPA`s4 benthic maps for different remote reef sites
- Evaluation document

Total Project Cost: \$154,000

Title: Improving coral reef fisheries and marine biodiversity management in the Caribbean by strengthening the management effectiveness of marine protected areas through capacity building and networking

Project Contact: Milton Haughton, CARICOM Fisheries Unit, Belize City, Belize

Project Description:

It will focus on strengthening management effectiveness in five MPAs in the Caribbean (Banco Chinchorro, Mexico; South water Caye, Belize; Parque Jaragua, Dominican Republic; Cades Bay, Antigua and Barbuda; and Moliniere-Beausejour, Grenada) by establishing a network for collaboration, information exchange and training. The project will use participatory research to identify stakeholders, identify and analyze problems, and develop countermeasures and strategies for their resolution. The project will include participation of local communities and other stakeholders affected by the establishment and management of the MPAs including women and minority groups that depend upon the coastal resources for their livelihood but have traditionally operated at the margins of the planning and decision-making process.

Project objectives:

Provide support for the establishment of a coherent, regional integrated framework of priority actions that will advance regional cooperation and enhance local capabilities to effectively conduct research, and develop and implement management plans;

Educate, sensitize and mobilize local communities, monitor and regulate activities within the MPAs in the region to improve their effectiveness in fisheries and marine biodiversity management.

To ensure that Caribbean marine reserve research and institutional strengthening activities are sustainable and continue in a directed and purposeful manner

To provide information and tools useful to managers in making decisions regarding MPA management.

Outcomes and Outputs:

- Established and strengthened operational structures with responsibility for management of the MPAs
- A review of ecological, biological and socioeconomic baseline information of the proposed networking areas
- Socioeconomic baseline surveys
- Improved capacity of the management, research, monitoring and support staff of the MPAs
- Explored alternative options for the implementation of the management plans and mobilization of resources
- Explored suitability of special areas in the target MPAs for the designing, and establishment of a marine reserves network
- Integrated Strategic Plans, Financing Plans and Work Plan for the MPA System for monitoring, control and surveillance
- Improved research results
- A better coordinated and integrated regional framework to support MPA management
- Established mechanisms for conflict management
- Expanded database and better access to information
- Strengthened linkages with local, national, and regional organizations involved in MPAs
- Identified stakeholders who are more informed, empowered, and involved in the management process.

Total project cost: \$208,000

Project Contact: Dr. Tegan Churcher Hoffmann, Coral Reef Alliance, San Francisco, California

Project Description: The overall goal of the Direct Support Program is to help coral park managers leverage tourism to build local investment in the conservation of coral reefs by targeting three primary audiences: 1) MPA managers 2) local communities, and 3) local tour/dive operators. To promote these public-private partnerships that support MPAs and reef conservation, CORAL will bring together Caribbean MPA managers/park practitioners, local community leaders and local tour/dive operators. Emphasizing the shared interests of these local park stakeholders, a three-module workshop series will be held at three different sites. The first module will be an overview of coral reef ecology, reef threats and reef conservation strategies. The second module will focus on strategies for collaborating in local reef conservation efforts. The third module will be about conservation solutions responding to each site's specific needs, such as fundraising, moorings, user-fees, low-impact tourism, overfishing, etc.

Project Objective:

To support the creation of public-private partnerships between Caribbean MPA managers, local communities and tour/dive operators to support local marine reserve efforts.

Project Outputs:

- Published articles in CORAL's newsletters and on our website;
- Press releases to relevant media, including diver and ecotourist publications such as Sport Diver and Rodale's Scuba Diving Magazine;
- Articles for relevant scientific and management publications, such as Coastal Management Journal, MPA News and Ambio

Project Outcomes:

- Three Caribbean park managers will have posted, and be routinely handing out, CORAL's diver and snorkeler guidelines and other user-friendly conservation materials designed to minimize tourism impacts on reefs.
- Three Caribbean parks will have completed a threat reduction assessment to help prioritize and strategize local conservation efforts in the marine reserve.
- Sixty percent of participating tour/dive operators will have initiated active support of their local marine reserve, either through donations of equipment, facilities, or staff, or through the collection of user fees, assistance in law enforcement activities, local underwater cleanups, maintenance and installation of mooring buoys, or similar activities.
- Sixty percent of participating tour/dive operators will routinely provide customers with low-impact diving/snorkeling orientations, briefings and other educational activities that have been shown to reduce diver/snorkel impacts on coral reefs.
- Presentations (CORAL Board members and staff) to interested audiences at scientific and practitioners conferences, such as the International Tropical Marine Ecosystems Management Symposium, and at dive industry and diver events.

Total project cost: \$177,875

Title: Direct Enhancement of the Sapodilla Cayes Marine Reserve Management Through Employment of Community User Groups as Deputy Rangers.

Project Contact: Jack Nightingale, Toledo Association for Sustainable Tourism and Empowerment (TASTE), Belize.

Project Description:

TASTE is currently a collaborative co-manager of the Sapodilla Cayes Marine Reserve (SCMR). Due to lack of resources, the limited presence of the Department of Fisheries in the SCMR causes continued practices of illegal fishing, poaching by foreign nationals, and unhealthy tourism. At Belize/ Guatemala settlement talks authorities decided that proper management is critical. The talks encouraged a community participation model in the co-management process. This proposal reflects precisely the implementation of that process with direct involvement of community user groups in creating the 'presence' needed to confront the problems of illegal fishing poaching and poor tourism. The SCMR Management Plan will be upgraded soon under the MBRS to a ten-year master management plan. The recruited community deputy rangers will participate directly in this process.

Project Objectives:

To create a seven-day/ 24-hour presence of Rangers and Deputy Rangers who are empowered to enforce fisheries laws and reserve regulations;

To create by the end of the project time period, a strong community participation in the direct protection and conservation of the SCMR.

To directly incorporate SCMR user groups through deputizing, training and empowering 8 community members.

Outcomes:

- Strengthened institutional arrangements for enforcement that will include the community's direct engagement
- Correlation of monitoring data of key commercial species against controls
- Improved commercial species fishery
- Improved reef ecology

Outputs:

- A master management plan that will include zoning with no-take zones, a more controlled tourism, business plans and everything required for a more effective management.
- Registered number of contacts with illegal fishermen, poachers, and misguided tourism incidents.
- Registered number of pursued confiscations, arrests, prosecutions
- Fully packaged report for replication to other MPAs.
- Sustainability outlines (3-10 Years)
- Management Plan MBRS/ TASTE/ COMMUNITY and 5 x 2-year operation plan, which includes this project.

Total Project Cost: \$114,180

Title: Improving Jamaican coral reef ecosystems with sustained productivity of reef fisheries through cooperative management

Project Contacts: Dr. Barbara L. Kojis, U.S. Virgin Islands Division of Fish and Wildlife, St. Thomas, U.S. Virgin Islands

Project Description:

The proposed project is to reduce the degradation of the coral reef community by over fishing by the fishers on the north coast of Jamaica through a process of provision of information, diversion of fishing effort to alternative fisheries and the introduction of management measures to progressively improve the productivity of the fishery. The work will be implemented on a consultative basis with the fishers, with their co-operatives or associations, with the assent of the government and in collaboration with local institutions. Two methods used will be the use of fish attraction devices (FADs) for concentrating stocks of pelagic fish and the development of inexpensive trapping systems for deep-water fauna, possibly caridean shrimp.

Project Objectives:

- To implement management methods and a diversification of fishing methods in coral reef fisheries on the north coast of Jamaica in consultation with the fishers, their co-operatives or associations and with the assent of the government.
- To implement management programs in Discovery Bay focusing on development of alternative fisheries and introduction of various management methods
- To organize stakeholders providing training, assisting with marketing unfamiliar products and seeking sources of equipment.
- Create a diversion of some of the fishing effort directed at the overexploited reef fish community to other resources

Outcomes/Outputs:

- Technical assistance from the USVI DFW in the use of FADs for local fishers from the Alloa Fishermen's Cooperative in Discovery Bay and established FADs for pelagic species.
- Established deep-water traps off the fore reef area for caridean shrimps.
- If cost-effective fishing methods are developed, the task will be to get the community to agree to a system that limits the use of the new gear, so that everyone will have a chance of moderate catches on a sustainable basis
- Implemented management programs that will reduce fishing pressure on coral reefs
- Potential for the establishment of an MPA

Total Project Cost: \$114,000

Title: Mona Island Marine Reserve Design and Enhancement of Connectivity Across the Mona Passage

Project Contact: Dr. Richard S. Appeldoorn, University of Puerto Rico-Mayagüez, Puerto Rico

Project Description:

Within the Caribbean region MPAs, there is still a need for linking marine reserves of adjacent islands to provide enhanced security of ecosystem processes by maintaining genetic diversity of marine species. This project will gather the data necessary for the establishment of a marine reserve within the Mona Island MPA in Puerto Rico and enhance the connectivity between this and other MPAs in the Mona Passage. In addition, the information generated on the interaction of habitats and population dynamics will be applicable to the design and management of other reserves protecting the same suite of species. In particular, the results of the Mona Island project may provide a basis for the establishment and management of other marine reserves within MPAs located in the Mona Passage.

Project Objectives:

Gather published information on the design approaches of existing marine reserves with a focus on goals applicable to Mona Island (Criteria analysis).

Quantify and map the essential fish habitats available for reef fish species at Mona Island based on available habitat maps.

Conduct field work to describe the spatial distribution and abundance of reef fish species at Mona Island.

- Provide a baseline for the siting, planning, design and future monitoring and evaluation of the marine reserve at Mona Island.
- Incorporate biological and ecological criteria into the decision making process of the Department of Natural and Environmental Resources in relation to the Mona Island marine reserve.
- Collaborate with researchers involved in similar studies in the Dominican Republic to enhance the establishment of marine reserves and connectivity across the Mona Passage.
- Conduct a map interpretation workshop with researchers from the Dominican Republic and Puerto Rico.

Project Outcomes/Outputs:

- Specific information required for the Mona Island marine reserve will be provided to DNER and NGOs involved in the reserve development process as a final report and at progress meetings.
- Coordination will be established with the researchers working on marine reserve design in the Dominican Republic to share results and experiences by annual meetings and conducting a map interpretation workshop.
- General reserve design and criteria analysis will provide a case study comparable to other MPAs in the Caribbean for other MPA and fisheries scientists. This information will be made available at regional meetings, which seek this type of information exchange.
- Scientific findings of this study will provide information to researchers through peer reviewed literature and scientific meetings at an international scale.

Total Project Cost: \$162,173

Project Contact: Laurretta Burke, World Resources Institute, Washington DC

Project Description:

The project is aimed at raising awareness and empowering decision makers with accurate information on the sources of threats to coral reefs. Mapping the coral reef locations using the best available information, an analysis will be implemented to ascertain the degree of threat from different sources, particularly coastal development, land-based sources of pollution and sediment, and overfishing whose effect is seriously degrading the rich coastal resources of this region. This comprehensive information base can then be used to facilitate efficient coastal zone management; ensuring decisions are based on reliable information rather than conjecture. Therefore the funding and implementation of this project will be paramount in successfully reducing the impacts of pollution, sedimentation and poorly implemented coastal development in a region dependent on its marine resources. There is also a lack of information on the economic value of healthy coral reefs versus degraded coral reefs and this information is vital to making the case for better management of coastal resources.

Project objectives:

- Collect and integrate information to improve the base of information available for examining threats to, status of, and protection of coral reefs within the wider Caribbean.
- Evaluate and model the relationships between human activities and reef condition, where available. Like the global R@R analysis, this will allow for extrapolation about threats to (and likely condition of) the many reefs for which survey information is not available.
- Develop a geographic information system (GIS)-based tool for more local-level evaluation of development scenarios and related implications for coral reef health and economic value.
- Raise awareness through wide dissemination of integrated data sets, model results, a published report, and the GIS planning tool.

Outputs and outcomes

- Hardcopy maps reflecting best available mapping of coral reef and mangrove habitats
- Hardcopy maps reflecting available information on coral reef condition, protection and threats to coral reefs
- Digital data sets reflecting best estimates of threats, value and protection status
- Full-color report summarizing findings, including maps of reef condition and threats to coral reefs
- Full-color poster of reef maps and summary of findings
- A web page with information on the results of the project, - methodology, maps and policy recommendations
- A GIS-based planning tool for scenario evaluation, linking human activities with reef degradation.

Total Project Cost: \$79,100*

* We are requesting only partial support for this project - to complete and produce the report. The work to date and contributions are already significant (\$300,000 from ICRAN partnership through UN Foundation, \$143,000 from USAID, other contributions from UNEP, the Henry, Munson and Homeland Foundations, Environmental Defense and NCORE, Miami).

Title: The Caribbean Marine Protected Areas Network and Forum (CaMPAM): a regional mechanism for enhancing management

Project Contacts: Robert Glazer, Gulf and Caribbean Fisheries Institute, Marathon, FL, and Alessandra Vanzella, United Nations Environment Programme, Caribbean Environment Programme, Jamaica

Project Description:

The Network of Caribbean Marine Protected Areas Managers (CaMPAM) was formed in 1998 as a mechanism for strengthening marine protected areas (MPAs) through sharing and collaboration in priority themes. The network has not generated the level of collaboration desired by members because of its informality. The absence of dedicated structures to support the level of problem solving and sharing of materials, personnel, and other resources are also contributing factors. Revitalizing and strengthening CaMPAM is an objective of UNEP's Caribbean Environment Programme (CEP), the Gulf and Caribbean Fisheries Institute (GCFI), and the World Commission on Protected Areas-Marine (WCPA) Caribbean. This project will provide the CaMPAM Network with the human resources and tools to undertake effective coordination of the collaborative arrangements of the Network, reconfirm the needs and priorities of Caribbean MPA managers and Fisheries Officers, and establish structures for more effective definition of issues and crafting of solutions. This project will also develop a close and complementary partnership between GCFI and CaMPAM in order to better support the needs of MPA managers and fisheries officers.

Objectives:

- Develop a comprehensive partnership to bring together MPA researchers, administrators, managers, and educators from governmental entities and non-governmental organizations as well as the private sector in an inclusive network to exchange ideas and lessons learned through a variety of mechanisms.
- To build upon GCFI's ongoing MPA annual special sessions and CaMPAM
- Develop and foster partnerships to discuss and address critical questions regarding gaps in scientific knowledge relative to biophysical and socioeconomic connectivity of MPAs across the Wider Caribbean.

Outputs and outcomes

- Annual GCFI workshop for MPA managers, researchers, and stakeholders focusing on their priorities. The results/recommendations of this workshop will be published on the GCFI website and/or in the Proceedings of the GCFI and distributed via GCFI/CaMPAM Network and Forum MPA listservers
- A Steering Committee (SC) comprised of the partners and managers of MPAs with established duties and responsibilities
- An electronic list-serve that will build capacity through sharing of technical information and enhanced communication and experience sharing
- Developed web-based tools for dissemination of up-to-date information
- Technical assistance through the UNEP/SPAW Small Grants Fund for MPAs
- Additional capacity through the UNEP MPA Training of Trainers Programme
- Exchange opportunities and site visits through ICRAN and other initiatives
- A comprehensive database on MPAs and their effectiveness
- Published GCFI Proceedings.
- Travel for MPA managers to attend the annual meeting of the GCFI
- Integrate the current GCFI and the existing CaMPAM listservers.

Total Project Cost: \$181,950

The Marine Reserves Regional Enhancement Plan for the Wider Caribbean MAREP

